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Expert Opinion

Catastrophic thinking about pain: A critical appraisal highlighting the importance of the social context and balance

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Abstract

Numerous research studies have shown that endorsing a catastrophic interpretation about pain is associated with deleterious outcomes, such as higher levels of distress, pain intensity and disability for the person in pain. The fear-avoidance model has been found to be useful in explaining these associations by stressing that heightened feelings of distress and behaviour aimed at reducing or avoiding pain might be adaptive in an acute pain context but can become maladaptive when the pain becomes chronic. Pain is rarely a private event and the communal coping model underscores that the heightened pain expression in people endorsing catastrophic thoughts about pain could have a social, communicative function of eliciting empathic responses in others. However, these models are not all-encompassing. In particular, neither of the models takes into account the growing evidence indicating that catastrophic thinking in observers can also impact their emotional experience and behaviour in response to the other's pain. Moreover, the context of multiple goals in which pain and pain behaviour occurs is largely ignored in both models. In this article we present an integrative perspective on catastrophic thinking that takes into account the social system and interplay between different goals people in pain and observers might pursue (e.g., school/work performance, leisure, social engagement). Specifically, this integrative perspective stresses the importance of considering the bidirectional influence between catastrophic thoughts in the person experiencing pain and observers. Furthermore, the importance of balance between pain-relief and other important goals as well as in the level of catastrophic thoughts in understanding the maladaptive influence of catastrophic thinking will be underlined. Clinical implications and future research directions of this integrated perspective are discussed.

Keywords: catastrophizing; pain; distress; protective responses; communicative function; integrated model; balance; social system.

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Introduction

Catastrophic thoughts about pain are defined as an exaggerated negative orientation towards actual or anticipated pain experiences. Based on the subscales of the Pain Catastrophizing Scale three subcomponents can be distinguished: 1) rumination (i.e., increased attentional focus on pain-related thoughts), 2) magnification (i.e., exaggerating the threat value of the pain stimulus) and 3) helplessness (i.e., adopting a helpless orientation in coping with pain; [1]). Catastrophic thinking about pain has received a considerable amount of research attention. In this review we will first provide a brief overview of the different associations that have been reported between pain catastrophizing and pain outcomes. Second, we will describe the fear-avoidance model, which has been used frequently to explain these associations. Following this, we will focus on the interpersonal aspects of catastrophic thinking by focussing on the communal coping model. We will end the review with a critical reflection on both these models and suggest an integrated perspective on catastrophic thinking, which improves upon these earlier models, and has implications for future studies and clinical practice.

Numerous studies provide evidence for the role of catastrophizing about pain in explaining deleterious pain outcome in adults [2-4] as well as in children [5], such as a heightened experience of pain [3, 4, 6] and disability in several domains of daily functioning [5-9]. Catastrophic thinking has also been found to be associated with a greater expression of pain as evidenced by more pain behaviour and facial pain expression [10-12], higher frequency and longer duration of hospitalization [13, 14] and increased medication use [15, 16]. Furthermore, several studies have provided evidence for a predictive role of catastrophic thinking by showing that catastrophic thoughts present in the early stages of the pain experience explain the development of later disability [17-20]. This research highlights the important role that catastrophic thinking about pain may play in the transition from acute to chronic pain. Two different, but not mutual exclusive, models, the fear-avoidance model and the communal coping model, have often been used to explain the association between catastrophizing and pain outcomes. We describe both of these models below.

The Fear-avoidance Model

The fear-avoidance model developed by Vlaeyen and Linton (2000) proposes that the way in which pain is interpreted (i.e., as threatening or non-threatening) is critical in understanding how people deal with pain. If pain is perceived as non-threatening, patients will likely engage in daily activities, which promotes their functional recovery. However, a threatening or catastrophic appraisal of pain is assumed to initiate a vicious circle, serving as a precursor for hypervigilance and pain-related fear or distress, which is in turn associated with a heightened motivation to reduce, escape or avoid pain situations [21-24]. These associations could be adaptive within an acute pain context, but may worsen the pain problem within the context of chronic pain. When attempts at pain relief fail, heightened engagement in behaviour aimed at diminishing, escaping or avoiding pain may lead to more disability and pain thereby, in turn, amplifying catastrophic thoughts and strengthen the motivation to persevere in pain relief strategies [21, 22, 25]. Consequently, these processes could explain the transition from acute to chronic pain as well as the maintenance of chronic pain problems [21].

Although a large body of evidence supports these different associations proposed by the fear-avoidance model of pain [21], the role of these processes in the transition from acute to chronic pain has not received straightforward support [26]. A challenge for future research is to shed more light on the role these processes play in the development and/or persistence of chronic pain. In particular, as most research is cross-sectional in design, more prospective research is needed to clarify the direction of these associations [4].

Interpersonal Context of Catastrophic Thinking

Although the majority of the research on pain catastrophizing has focused on intrapersonal aspects of pain (i.e., related to own pain experiences), catastrophic thinking has also shown to play an important role within the interpersonal context of pain (i.e., when observing another's pain). Pain is rarely a private event and the interpersonal role of pain and associated processes needs to be appreciated. Pain has the potential to grasp the attention of others, thereby influencing the behaviour of others in the social environment [27]. In particu-

lar, the socio-communicative model of pain recognizes three important steps in the process of communicating pain. The sufferer's internal experience of pain (step 1) needs to be encoded in expressive pain behaviours (= step 2), in order to be decoded by the observer to draw inferences about the pain experience of the sufferer (step 3). The behavioural responses of the observer, based upon the inferences the observer draw, may, in turn, have an impact upon the other's pain experience (step 1) and pain expression (step 2; [27]). The communal coping model underlines how catastrophic thinking may impact how pain is communicated and how others in turn respond to the pain expressions of individuals with high levels of catastrophic thoughts.

The communal coping model proposes that the exaggerated pain expression in people who catastrophize about their pain serves a communicative function of maximizing the proximity or empathic response from others in the social environment. In this way the probability that their distress will be managed in a social rather than an individual context is maximized [10]. Evidence has indeed shown that the social context (i.e., presence of a parent, spouse or stranger versus being alone) has more impact on the pain behaviour of individuals with high levels of catastrophic thoughts compared to individuals with low levels of catastrophic thinking [11, 28, 29]. Accumulating failure to cope with pain experiences on their own might explain why individuals endorsing high levels of catastrophic thoughts prefer to deal with pain in a social manner [10, 11, 28]. Moreover, it has been found in healthy as well as chronic pain samples, that individuals with high levels of catastrophic thinking communicate more about their pain, i.e., are more likely to disclose their pain-related distress [30, 31] and feel more entitled to receive support [32].

The communal coping model further recognizes that this social way of coping with pain is only viable if others in the environment indeed infer more intense pain and respond in a solicitous way to the person in pain. These solicitousness responses from others might even trigger, maintain or reinforce exaggerated pain expressions [4, 10, 33]. Evidence of more solicitousness responding to pain experiences of individuals endorsing high levels of catastrophic thoughts about their pain is mixed [32, 34]. A positive relation has been found between high levels of catastrophizing in individuals experiencing chronic pain and their perception of solicitousness responses but only for short pain durations and when the person in pain felt less entitled to receive support [32]. Accordingly, the communal coping model stresses that this social manner of dealing with pain might only be maladaptive under chronic pain conditions in which the balance between support and increasing distress becomes disrupted and can even elicit more negative responses by others [10, 30, 34].

Critical Appraisal of both Models

The fear-avoidance model and communal coping model on pain have both received considerable support and shown great potential to explain several processes and outcomes associated with pain catastrophizing. Although the models are not mutually exclusive, neither is all-encompassing and several aspects remain unexplained by both models.

Firstly, although the communal coping model nicely demonstrates how catastrophic thoughts in the person experiencing pain can impact the social environment, neither of the models take into account that catastrophic thinking might also occur in the observer and thereby impact their pain estimation, emotional experience and behavioural responses to pain in others [35]. Supporting evidence has indicated that observers with high levels of catastrophic thoughts about pain, compared with observers low in pain catastrophizing (e.g., parent, spouse, stranger), infer more intense pain in others (e.g., child, spouse, stranger [36-38]. Moreover, the available research addressing the impact of catastrophic thinking on the experience of the observer is growing and indicates that catastrophizing about the pain of a significant other, e.g. their child or spouse, is related to more feelings of distress in response to the other's pain [37, 39-43]. Endorsing catastrophic thoughts about other's pain and associated feelings of distress also have important implications for caregiving behaviour. Specifically, parents who catastrophize about their child's pain engage more in protective behaviour reflected by increasingly restricting the child's pain-inducing activities, comforting the child and giving attention to the child's pain [41, 42, 44]. Furthermore, parental distress has shown to play an important mediating role in this association between parental catastrophizing and protective responses [41].

Importantly, parental catastrophic thinking about child pain is not only related to negative pain outcomes for the caregiver, but also for the child suffering from pain [39, 40]. Specifically, in healthy school children as well as children with chronic pain, high levels of parental catastrophic thinking about their child's pain have found to be associated with heightened levels of pain intensity, somatic complaints and functional disability [39, 44, 45]. Parental protective behavioural responses may play an important role in this association [44, 45]. Specifically, research has indicated that parental distress and related protective, pain-attending behaviours are related to more pain, distress, somatic complaints and functional disability in children and adolescents [44-51]. Particularly parents endorsing high levels of catastrophic thinking seem most likely to experience child pain as distressing and engage in maladaptive behavioural responses to child pain. In a similar vein, it has been shown in adults that higher levels of protective, solicitous responses by significant others (e.g., partner) are associated with higher levels of pain intensity and less acceptance of the pain situation in the person with pain [52, 53].

Secondly, both models only focus on the underlying motivation of pain-behaviour (i.e., fear avoidance or social coping) but ignore the impact of other important goals in life on the extent to which people engage in pain behaviour or protective responses to others' pain. Goals can be described as internal representations of desired states that direct various behaviours such as good performance at school/work and going out with friends [54]. Importantly, motivational accounts hold the core assumptions that humans can pursue multiple goals at one time, which cannot be considered in isolation. Consequently, the interrelationship between different goals is crucial in understanding behavioural responses [54]. Due to a hierarchical organization from abstract goals representing how people want to "be" (e.g., being a good parent) to more concrete goals reflecting things to "do" in order to accomplish higher order goals (e.g., making time to play with my child), there are different behaviours to attain a specific goal [55, 56]. Moreover, one specific behavioural strategy can also contribute to attaining different higher-level goals [56-58]. On the other hand, due to limited resources or incompatible goal attainment strategies, pursuing one goal can also interfere with or impair success in other goals [58]. Various strategies to reduce this goal conflict are possible: selecting or prioritizing one goal, finding a flexible balance between or redefining one or more of the competing goals [57]. The motivational strength or the importance of a goal plays a major role in all these strategies. Goals are not equally important and their importance can change. Specifically, the importance of goals is influenced by multiple factors such as success expectancies, situational demands and individual characteristics [54, 57, 59]. Applied to the context of pain, engaging in pain behaviour or protective responses might reduce the possibility that the individual in pain will achieve other important goals. Consequently, in order to fully understand behavioural responses to own or others' pain, it is important to take into account that pain and pain behaviours occur in a context of multiple, competing goals. When confronted with pain, both the person in pain and observers may juggle with attaining pain relief and other goals, and need to find a balance between these competing goals. Taking into account a motivational perspective when explaining the impact of pain catastrophizing offers the advantage of a dynamic analysis of pain behaviour, meaning that pain behaviour can vary according to the goals elicited by a particular situation [23].

Taken together, these findings clearly indicate that a more integrative perspective describing catastrophic thinking within the broader social context and a context of competing goals is needed in order to explain the maladaptive influences of pain catastrophizing.

Integrated Perspective on Catastrophic Thinking

The integrated perspective on pain catastrophizing that will be presented in this article does not exclude use of either the fear-avoidance model or communal coping model, but rather suggests that both models are not mutually exclusive and can be combined in a larger integrated model on catastrophic thinking. This integrated perspective stresses two major aspects that are in need of more research attention and can easily be addressed by elaborating on the existing perspectives: incorporating the social system and the importance of balance between multiple, simultaneous goals.

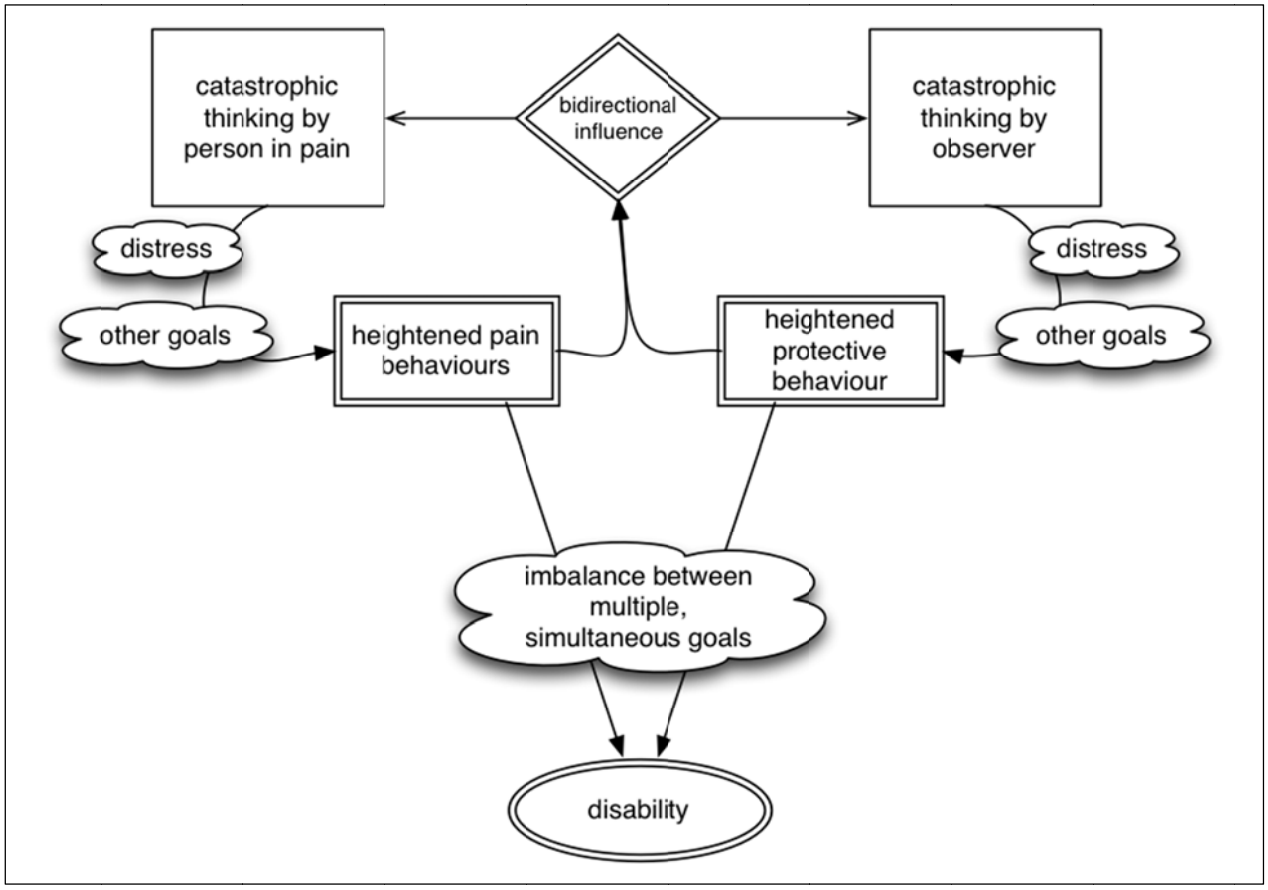

Figure 1. Graphic representation of integrative perspective on catastrophic thinking about pain.

Catastrophic Thinking within Social System

An important aspect of an integrated perspective on pain catastrophizing is to take into account that catastrophic thinking not only occurs in the person experiencing pain, but also in the observers in the social environment. The communal coping model already nicely demonstrates how catastrophic thoughts in the person in pain can impact behavioural reactions by observers. However, the level of catastrophic thinking in observers and associated processes can in turn also impact the pain experience and disability of the person in pain. The investigation of these bidirectional influences between catastrophizing in the person in pain and observer is currently lacking. Both the fear-avoidance model and the communal coping model can be applied to explain responses to other's pain in observers who catastrophize about other's pain and their impact on other's disability due to pain. For example, in accordance with the fear-avoidance model, parental protective behavioural responses in parents endorsing catastrophic thoughts about child pain can be interpreted as a strategy of parents to reduce, escape or avoid child pain [41, 42, 44, 60-63]. Moreover, as the heightened level of distress plays an important role in this association, it is plausible to assume that the preference for protective behaviour by high catastrophizing parents could be primarily because it functions as a way to alleviate their own overwhelming feelings of distress [41, 44]. In support of the communal coping model, parents/spouses who catastrophize about the pain in their child/spouse may engage in more protective responses due to their heightened estimation of their child/spouse pain and thereby further stimulate heightened pain expressions by the person in pain. This reinforcing of pain behaviours by others might be especially crucial in shaping

how children deal with pain experiences. In particular, although future research is needed, protective responses by parents endorsing high levels of catastrophic thinking might reinforce a social way of dealing with pain and a catastrophic interpretation of pain in their children [64].

The Importance of Balance between Multiple, Simultaneous Goals

Behaviour of people who experience pain or observe another in pain is not only motivated by their goal to reduce pain, but also by other aspirations or goals (e.g., school/work, leisure activities, social engagement). The motivation to reduce own or other's pain, therefore needs to be examined within the context of these multiple, possibly competing goals. When applying the motivational account described above to the context of pain it is reasonable to assume that pain relief will probably be highly valued and prioritised over other competing goals by most, thereby motivating engagement in protective behaviour in response to own or other's pain. However, a strong priority for pain-relief goals might hinder the pursuit of other important goals (e.g., engagement in daily activities such as school/work, social activities; [64, 65]). Being able to maintain a balance between pain-relief and other important aspirations might be crucial in understanding adaptation to pain. This motivational perspective can easily be integrated in both the communal coping model as well as the fear-avoidance model and could explain why the proposed coping strategies by individuals who catastrophize about pain depend upon the situational characteristics and are particularly maladaptive in chronic pain situations.

In acute pain situations a focus or priority on pain relief, by heightened expression of pain or pain-avoidance tendencies, could be adaptive as it promotes the pursuit and attainment of other important goals once pain relief is achieved. However, in the case of chronic pain, perseverance in pursuing the goal of pain relief despite several failed attempts has the potential to interfere with other important life aspirations, thereby leading to frustration and disability [23, 24]. Moreover, it is likely that this pain-relief goal would be particularly prevalent in individuals who endorse catastrophic thoughts (or a threatening interpretation) about own or other's pain [21, 22]. In support of this assumption, evidence suggests that individuals who catastrophize about their pain tend to have the belief that reducing their pain is inevitable to regain a valuable way of living [66, 67]. Consequently, re-orienting priority away from pain relief in order to be able to engage in other valued life activities despite pain might be particularly difficult to achieve when pain is perceived as highly threatening, which may lead to a greater level of goal conflict, pain-related interference and disability [65, 68, 69]. Finding a flexible balance between pain-relief and other important goals, by adjusting goals and goal priorities, could however be more beneficial for daily functioning and well-being [70-74]. Incorporating this motivational perspective within in the fear-avoidance model could strengthen its capacity of explaining the transition from acute to chronic pain, as the ability to find a balance between various, competing goals might be crucial in explaining this transition.

Furthermore, a full understanding of the maladaptive consequence of pain catastrophizing, might not only require taking into account the aspect of balance within the context of multiple, competing goals, but a balanced level of catastrophic thinking might be equally crucial. This reasoning is in line with conceptualization concerning worrying, defined as "*A chain of thoughts and images, negatively affect laden and relatively uncontrollable*" [76]. Moderate levels of worry are beneficial as it promotes successful problem solving and anxiety reduction, while chronic or pathological worrying tends to be associated with an exacerbation of the problem, resulting in a perseverance loop in which the failure to find a solution amplifies worry and unsuccessful problem-solving attempts [24, 77]. Applied to a pain context, independent of the pain situation it is plausible to assume that a moderate level of worrying or rumination (i.e., one component of catastrophic thinking) might be adaptive as it urges to engage in behaviours aimed at relieving pain. However, persistent heightened levels of catastrophic thoughts or catastrophic worry about pain (also including high levels of helplessness and magnification) and associated priority for pain relief might be maladaptive as it could interfere with attaining goals in other important aspects of life [65, 68]. On the other hand, the absence of threat perception, in both the person in pain and observers, when confronted with pain

could be equally maladaptive [75]. Consequently, reframing the pain situation as moderately threatening might engender adequate, moderate levels distress, worrying or rumination and associated problem-solving tendencies [24, 77], but not at the cost of other important life goals, i.e., attuned to the needs of individual in pain. Clearly, more research on the theoretical conceptualisation of catastrophic thinking and the related concept of worry is needed.

Future Research Directions

Bidirectional Influences of Pain Catastrophizing

To date research on catastrophic thinking about pain has focused on catastrophizing either in the pain patient or a significant other, such as parents or spouses. However, more research is needed to investigate the bidirectional impact of low versus high catastrophic thoughts in both the pain patient and important others and how this influences the disability experienced by the person in pain. Preliminary evidence has surprisingly shown that the highest level of pain behaviour can be found in individuals endorsing high levels of catastrophic thinking who have a spouse low in pain catastrophizing and not, as expected, with a spouse endorsing high levels of catastrophic thinking. An explanation put forward to explain this unexpected finding was the possibility that pain patients with high levels of catastrophic thinking who have a spouse with low levels of catastrophic thinking might feel the need to increase their pain behaviours in order to communicate the severity of their pain experience to their spouse [78]. However, replication and more research is needed to enhance our understanding of these bidirectional associations. Furthermore, investigations of these bidirectional influences in the context of pediatric pain are currently lacking.

The bidirectional influence between catastrophic thoughts could be of particular importance in explaining the development of catastrophic thinking in children. Preliminary research has indicated a maladaptive influence of parental catastrophic thoughts on child functioning and the important role of parental protective responses [39, 44, 45]. However, more research is needed to investigate mechanisms underlying the influence of parental catastrophizing about child pain and associated responses on how children experience and respond to their pain. Intergenerational transmission of pain catastrophizing could be an important mechanism that, to our knowledge, has not yet received research attention within the context of pediatric pain. Intergenerational transmission can be described as the process through which an earlier generation psychologically influences the attitudes and behaviour of the next generation by for example observational learning, coaching and other cognitive processes, such as mental representations [79]. Considerable research has supported the mechanism of intergenerational transmission of aggressive behaviour, attachment style and parenting [79, 80, 81]. It is plausible that this process is also applicable to the context of pain. Preliminary evidence revealed the importance of observational learning as a source of pain-related fear and behavioural responding to pain [64, 82-84]. Although interesting from a theoretical perspective as well as for clinical practice no research is available on the intergenerational transmission of parental pain catastrophizing, through for example observational learning and the conditions under which this takes place [64]. It is reasonable to assume that children who are exposed to parents displaying catastrophizing about pain might also be more likely to endorse catastrophic thoughts about pain. This process may then further explain and contribute to the maladaptive influence of parental catastrophic thoughts upon child functioning.

Goal Flexibility and Relation with Pain Behaviour and Disability

More research is needed to explore goal-related processes when faced with own or other's (chronic) pain and how goals translate into different behaviour in response to pain. Investigation of these motivations within a context of multiple goals will allow for a better understanding of why people engage in a particular behaviour toward their own or other's pain. When confronted with pain, pain relief will probably be highly valued goal by most, which will be reflected in their behavioural responses. As for any goal, both the person in pain and observers, can engage in different behavioural responses, such as attending to the pain, distracting or neglecting the pain, to try to attain the goal of pain relief [55, 56, 58]. The adaptive or maladaptive impact of a response might depend on the extent to

which the behavioural response reflects a balance between the goal of pain relief and other important aspects or goals in the pain patient's life. Specifically, although the use of coping strategies, such as distraction, could be motivated by the goal of pain relief, engaging in distraction may also promote attainment of other important daily activities despite the pain. This could explain the positive influence of this coping-promoting strategy on functioning [85-88]. In contrast, protective responses, such as staying home from school/work, may reflect a strong priority to reduce pain even if this negatively impacts their daily functioning substantially. Consequently, the heightened engagement in protective responses by individuals in pain and observers with high levels of catastrophic thinking could reflect an imbalance between multiple competing goals when confronted with pain. Further research is needed to investigate how pain patients and observers flexibly attune between pain-relief and non-pain needs, if this is more difficult to attain by individuals who endorse high levels of catastrophic thinking and how this translates into behavioural responses to pain.

Clinical Implications

The association between catastrophic thinking about pain and increased levels of distress and protective behaviours in both the person in pain and observers indicates that, in clinical practice, it may be important to target catastrophic thoughts about pain not only in the person experiencing pain, but also in others who are part of the social system. Although individual as well as group interventions utilizing the principles of cognitive-behavioural therapy, such as reappraisal, extended by focussing on behavioural activation, have proven to be promising [10], less research has focused on incorporating the social system into therapy [89]. The above described integrated perspective on catastrophic thinking stresses the importance of focusing on all members of the social system of the pain patient in pain management (spouse, parent). Targeting parental/spouse catastrophic thoughts may not only alleviate parental/spouse distress, but could also be of benefit for the child's/other spouse's pain experience. Benefit for the child/spouse in pain is likely achieved through modification of protective behaviours engaged in by the parent/spouse. Specifically, evidence suggests that parental/spouse catastrophic thinking and associated feelings of distress may impact the functioning of the child/spouse in pain by a heightened engagement in protective behaviour [44, 45, 53]. Accordingly, targeting catastrophic thinking may not only decrease parental/spouse distress, but may also diminish protective tendencies, and as such, potentially lead to better adjustment by the child/spouse in pain. In support of this, recent evidence has indicated that validation of another's pain experience had a positive impact on the emotional experience on the person in pain and promotes behavioural change such as adherence to a pain task [90]. In line with clinical practices beneficial for pain patients endorsing catastrophic thoughts about their pain, several strategies might be available to manage high catastrophic thoughts in observers.

The extent to which protective behaviour might serve as a strategy to reduce feelings of distress, it may not be necessary to alter catastrophizing per se, but instead, provide individuals with high levels of catastrophic thoughts with effective emotion regulation strategies to alter the negative impact of catastrophic thinking outcomes [91-93]. Emotion regulation strategies could include for instance, attention modification or cognitive re-appraisal [94]. Although further research is needed, it is possible that effective regulation of self-oriented feelings of distress may be a key process in facilitating other-oriented feelings of sympathy in observers [95, 96]. These feelings of sympathy could enable flexible, effective care attuned to the needs of the sufferer in pain [40, 97] instead of having the urge to focus on pain relief in order to reduce their own feelings of distress [97, 98].

Furthermore, research has indicated that it might be especially worthwhile to target their prioritisation for pain control and to stimulate a shift in perspective from pain control to a valued life despite the pain. This approach has the potential to change their responses to other's pain in a more fundamental way compared with interventions merely focusing on behavioural tendencies [10, 99, 100]. Consequently, in clinical practice, it may be important, especially in persons endorsing catastrophic thoughts about pain, to identify distress and associated protective tendencies as substantially contributing to disability. Realizing that engagement in important, daily activities despite the pain is possible and worthwhile might be crucial in this regard [100].

Future research is needed to establish the effectiveness of incorporating all members of the social system in reducing disability in the pain patient and the strategies that are most effective to reduce the maladaptive impact of catastrophic thoughts in significant others (e.g., parents and spouses).

Conclusion

Research clearly shows the maladapative consequences associated with pain catastrophizing, both for those experiencing pain as well as those observing pain in others. Robust associations have been found with distress and protective behavioural responses, which in turn contribute to elevated levels of pain intensity and disability. Several models (e.g., fear-avoidance model and communal-coping model) have been formulated to explain these associations. Although the models are not mutual exclusive, neither is all-encompassing. Importantly, neither of the models acknowledge that pain behaviours occur within a context of multiple, possibly conflicting goals and the possibility that catastrophic thoughts can occur in observers thereby impacting the pain experience of the person in pain. We offer a more integrated perspective on catastrophic thinking about pain that stresses the bidirectional impact of catastrophic thoughts in all members of the social system and the importance of balance in explaining the maladaptive impact of pain catastrophizing. This integrated perspective has important clinical implications and can be used to stimulate future research on the development of catastrophic thoughts about pain and goal flexibility.

Disclosure

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